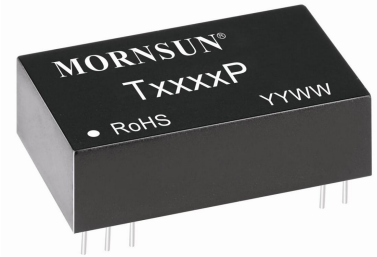
Signal conditioning modules
TxxxxP Series

MORNSUN®

Active high precision signal conditioning module



CE Report EN62368-1

RoHS

3 years Warranty

FEATURES

- Four-port isolation (signal input, signal output, power input and power output terminals are all isolated from each other)
- High accuracy of 0.1% Full Scale
- Isolation test voltage 2.5kVDC (60s)
- Low temperature coefficient 50PPM/℃
- Industrial grade operating temperature from -40℃ to +85℃
- Low ripple & noise 30mVp-p

TxxxxP series signal conditioning modules (also called isolated transmitter), are analog signal conversion modules with incoming current/voltage signal input which is transformed into isolated current/voltage signal output. With an embedded high-efficient micro-power supply, the product self-supplies power to the internal signal processing circuit and inputs isolated power to the preceding-stage transducer at the same time. The electromagnetism isolation technology of the product ensures that input/output/power supply/power distribution path are all isolated from each other, meaning these products can completely replace traditional linear optocoupler isolators, providing much higher accuracy and extremely low temperature drift in comparison to optocouplers. The TxxxxP series are widely used in PLC, DCS, MCU and other isolated signal conversion applications.

Selection Guide

Certification	Part No.	Power Supply input Typ. (VDC)	Input Signal	Output Signal	Isolation Power Output (VDC)
--	T1130P	24	4-20mA	4-20mA	None
	T1133P	24	4-20mA	4-20mA	24
	T1430P	24	4-20mA	1-5V	None
	T1433P	24	4-20mA	1-5V	24
	T1450P	12	4-20mA	1-5V	None
	T1530P	24	4-20mA	0-10V	None
	T1533P	24	4-20mA	0-10V	24
	T1630P	24	4-20mA	0-5V	None
	T2230P	24	0-20mA	0-20mA	None
	T2233P	24	0-20mA	0-20mA	24
	T2633P	24	0-20mA	0-5V	24
	T2650P	12	0-20mA	0-5V	None
	T4130P	24	1-5V	4-20mA	None
	T4630P	24	1-5V	0-5V	None
	T5130P	24	0-10V	4-20mA	None
	T5133P	24	0-10V	4-20mA	24
	T5150P	12	0-10V	4-20mA	None
	T5153P	12	0-10V	4-20mA	24
EN	T5230P	24	0-10V	0-20mA	None
	T5530P	24	0-10V	0-10V	None
--	T5533P	24	0-10V	0-10V	24
	T5550P	12	0-10V	0-10V	None
	T5555P	12	0-10V	0-10V	12
	T5630P	24	0-10V	0-5V	None
	T5650P	12	0-10V	0-5V	None
	T5660P	5	0-10V	0-5V	None
	T6130P	24	0-5V	4-20mA	None
	T6150P	12	0-5V	4-20mA	None
	T6230P	24	0-5V	0-20mA	None
	T6235P	24	0-5V	0-20mA	12

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--	T6250P	12	0-5V	0-20mA	None
	T6530P	24	0-5V	0-10V	None
	T6560P	5	0-5V	0-10V	None
	T6630P	24	0-5V	0-5V	None
	T6640P	15	0-5V	0-5V	None
	T6650P	12	0-5V	0-5V	None
	T6S36P-2.5	24	0-5V	0-2.5V	5
	T6S60P-3	5	0-5V	0-3V	None

Notes: Customization of products is available on request.

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Power Input	Input voltage		Typ.-5%	Typ.	Typ.+5%	VDC
	Input power	Isolation signal power at full load	--	--	2.0	W
	Power supply protection		Input reverse polarity protection			
Signal Input	Input signal		See selection guide			
	Input impedance	In case of max. input of current signal	--	--	250	mV
		In case of max. input of voltage signal	10	--	--	MΩ
	Over range	In case of current signal input	--	--	50	mA
		In case of voltage signal input	--	--	30	V

Output Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Power Output	Output voltage	Isolated power output at full load	Typ.-10%	Typ.	Typ.+10%	VDC
	Output current		--	--	25	mA
	Short circuit protection	Ta=25℃	Continuous short-circuit protection (except 24V input part)			
Signal Output	Output signal		See selection guide			
	Load capacity	In case of max. output of voltage signal	2	--	--	kΩ
		In case of max. output of current signal	--	--	500	Ω
	Ripple & Noise	20MHz Bandwidth	--	30	--	mVp-p

Transmission Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Signal Precision	Ta=25℃	-0.1% FS	--	+0.1% FS	--
Power Regulation	Power supply input Typ. ±5%	-0.05% FS	--	+0.05% FS	--
Load Regulation	Change from no-load to full load	-0.05% FS	--	+0.05% FS	--
Temperature Coefficient	Operating temperature from -40℃ to +85℃	--	--	50	PPM/℃
Band Width		2	--	--	kHz
Response Time		--	--	1	ms

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Electric Isolation		Four-port isolation (signal input, signal output, power input and isolation power output are all isolated from each other)			
Isolation Voltage	Electric Strength Test for 1 minute with a leakage current <1mA, humidity <70%RH	2.5	--	--	kVDC
Isolation Resistance	500VDC	100	--	--	MΩ
Operating Temperature		-40	--	+85	℃
Transportation and Storage Temperature		-40	--	+85	℃

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Case Temperature Rise	Ta=25℃	--	--	30	℃
Safety Standard		EN62368-1 (Report)			
Application Environment		The presence of dust and corrosive gas may cause damage to the product			

Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant
Package	DIP24
Weight	11.5g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Immunity	ESD	T1433P, T5650P, T5150P, T5660P, T6640P	ANSI/ESDA/JEDEC JS-001	HBM ±4kV	
		Others	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
	EFT		IEC/EN61000-4-4	Power supply port ±2kV (see Fig. 3 for recommended circuit)	perf. Criteria B
			IEC/EN61000-4-4	Other ports ±1kV (see Fig. 3 for recommended circuit)	perf. Criteria B
	Surge		IEC/EN61000-4-5	Power supply port ±1kV (see Fig. 3 for recommended circuit)	perf. Criteria B
			IEC/EN61000-4-5	Other ports ±1kV (line to ground) (see Fig. 3 for recommended circuit)	perf. Criteria B

Application Precautions

1. Carefully read and follow the instructions before use; contact our technical support if you have any question;
2. Do not use the product in hazardous areas;
3. Use only DC power supply source for this product. 220VAC power supply is prohibited;
4. It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction.

After-sales service

1. Factory inspection and quality control are strictly enforced before shipping any product; please contact your local representative or our technical support if you experience any abnormal operation or possible failure of the module;
2. The products have a 3-year warranty period, from the date of shipment. The product will be repaired or exchanged free of charge within the warranty period for any quality problem that occurs under normal use.

Applied circuit

Please refer to Isolated Transmitter application notes.

Design Reference

1. Wiring diagram for product application

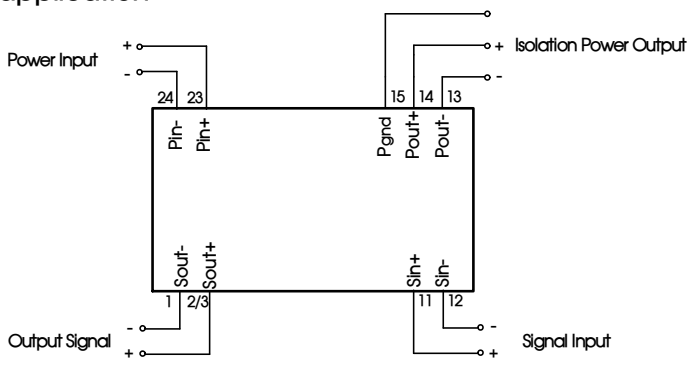


Fig. 1

Notes:
①For modules with no isolation power output, Pin no. 13, 14 and 15 are not connected (NC).
② For the isolated bi-polar power modules, Pin 13 (Vout-) is isolated negative power output, Pin 14 (Vout+) is isolated positive power output and Pin 15 is reference ground.
③For isolation single power modules, Pin 13 (Vout-) is the isolated negative power output, Pin 14 (Vout+) is the isolation positive power output and Pin 15 is NC.

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2. Schematic diagram of signal input and signal output(Ideal state)

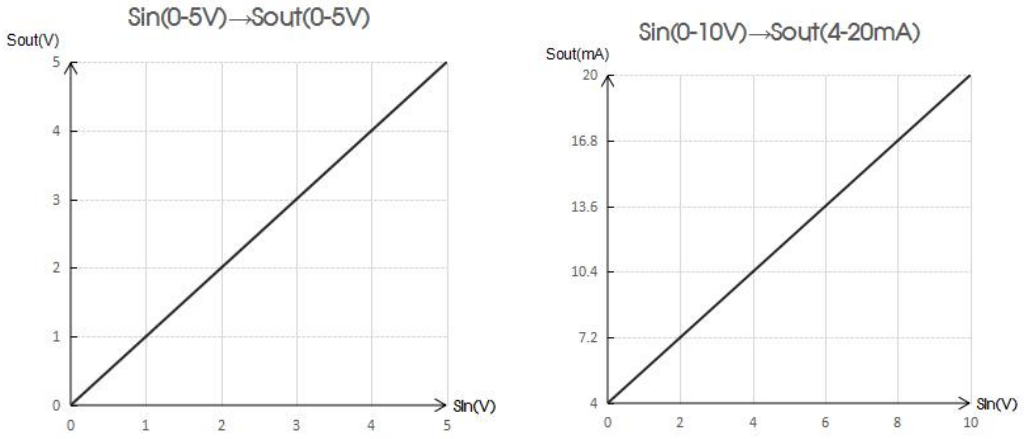


Fig. 2

3. EMC compliance recommended circuit

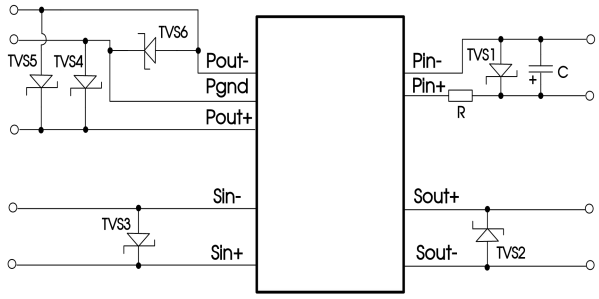


Fig. 3

Component	Recommended part
TVS1	SMCJ30A
TVS2	SMBJ15A
TVS3	SMBJ15A
TVS4	SMBJ15A
TVS5	SMBJ28A
TVS6	SMBJ15A
R	2Ω/1W
C	220uF/35V

Notes : ① Part T2633P must have resistance R connected at Pin+, all other parts do not need the R.

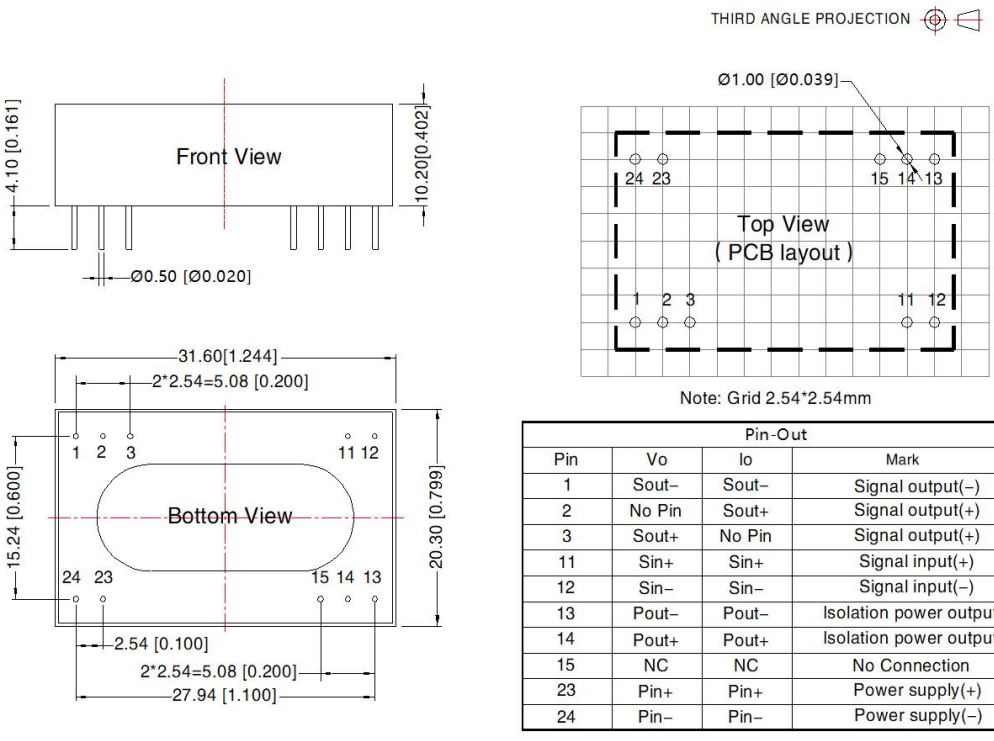
② For the isolated bi-polar power modules, Pin 13 (Pout-) is isolated negative power output, Pin 14 (Pout+) is isolated positive power output and Pin 15 is reference ground.

③ For isolation single power modules, Pin 13 (Pout-) is the isolated negative power output, Pin 14 (Pout+) is the isolation positive power output and Pin 15 is NC, therefore NO need for TVS4 and TVS6.

4. For more information please find the application notes on www.mornsun-power.com

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Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

Pin-Out			
Pin	Vo	Io	Mark
1	Sout–	Sout–	Signal output(–)
2	No Pin	Sout+	Signal output(+)
3	Sout+	No Pin	Signal output(+)
11	Sin+	Sin+	Signal input(+)
12	Sin–	Sin–	Signal input(–)
13	Pout–	Pout–	Isolation power output–
14	Pout+	Pout+	Isolation power output+
15	NC	NC	No Connection
23	Pin+	Pin+	Power supply(+)
24	Pin–	Pin–	Power supply(–)

NC: No connection

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58210008;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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